We claim:

1. A method of fabricating a vacuum microtube device comprising the steps of:

forming a cathode layer comprising an array of electron emitters;

forming a gate layer comprising an array of openings for passing electrons from the electron emitters;

forming an anode layer comprising an array of anodes for receiving electrons; and

vertically aligning and spacing the cathode layer, the gate layer and the anode layer and bonding them together on a substrate comprising silicon so that electrons from the emitters pass through the gate openings to the anode.

2. The method of claim 1 wherein the cathode layer comprises silicon.

3. The method of claim 1 wherein the cathode layer, the gate layer and the anode layer are bonded together with one or more intervening spacer.

4. The method of claim 1 further comprising the step of disposing between the gate layer and the anode, an electron multiplying structure comprising secondary electron emission material in the path of emitted electrons for multiplying the electron flow between the cathode and the anode.

5. A vacuum microtube device comprising:

a cathode layer comprising an array of electron emitters;

an anode layer for receiving electrons from the emitters; and

a gate layer between the cathode layer and the anode layer, the gate layer comprising an electrode for inducing electron emission and an array of openings for passing electrons from the emitters to the anode;

wherein the cathode layer, anode layer and gate layer are vertically aligned and spaced and bonded on a substrate comprising silicon.

6. The device of claim 5 wherein the gate layer is resilient and includes first magnetic components and the device further comprises controllable second magnetic components positioned to interact with the first magnetic components to change the spacing between the cathode and the gate.

7. The device of claim 6 wherein the second magnetic components are attached to the cathode.

8. The device of claim 6 further comprising a feedback circuit for controlling the second magnetic components.

9. A device according to claim 5 further comprising secondary electron emission material in the path of emitted electrons between the cathode and the anode for multiplying the electron flow.

10. The device of claim 5 wherein the device provides a density of arrayed amplifier devices of at least $1000/cm^2$ and preferably at least $3000/cm^2$.

11. The device of claim 5 wherein the cathode layer comprises silicon.

12. The device of claim 5 wherein the electron emitters comprise carbon nanotubes.